What is claimed is:

1. A method for locating an object of interest, the method comprising:

a) accepting at an observation point, signals emanating from the object;

b) determining, for each of the accepted signals, at least one of (A) an associated time of arrival, (B) an amplitude, and (C) a direction of arrival;

c) determining at least two trace-back rays from the observation point using the direction of arrival of signals and topographical information;

d) determining candidate locations at crossings of two or more trace-back rays;

e) determining a set of final candidate locations from the determined candidate locations; and

f) determining the location of the object of interest using the set of final candidate locations.

2. The method of claim 1 wherein the act accepting at an observation point, signals emanating from the object, includes screening the signals using a physical characteristic of the signals.

3. The method of claim 1 wherein the act accepting at an observation point, signals emanating from the object, includes screening the signals using a bandpass frequency filter.

4. The method of claim 1 wherein the act accepting at an observation point, signals emanating from the object,

includes screening the signals using a signal amplitude threshold.

5. The method of claim 1 wherein the act accepting at an observation point, signals emanating from the object, includes screening the signals using a signal-to-noise threshold.

6. The method of claim 1 wherein the act accepting at an observation point, signals emanating from the object, includes screening the signals using an angle of arrival threshold.

7. The method of claim 1 wherein the act accepting at an observation point, signals emanating from the object, includes screening the signals using a relative time of arrival threshold.

8. The method of claim 1 wherein the act accepting at an observation point, signals emanating from the object, includes screening the signal using information carried by the signals.

9. The method of claim 1 wherein the act of accepting at an observation point, signals emanating from the object, includes screening the signal using a unique identifier carried by the signals and associated with the object.

10. The method of claim 1 wherein the act accepting at an observation point, signals emanating from the object, includes screening the signal using both (A) a physical

characteristic of the signals, and (B) information carried by the signals.

11. The method of claim 1 wherein the act of determining, for each of the accepted signals, at least one of (A) an associated time of arrival, (B) an amplitude, and (C) a direction of arrival, includes determining all of (A) an associated time of arrival, (B) an amplitude, and (C) a direction of arrival.

12. The method of claim 1 wherein the topographical information includes sources of signal reflection.

13. The method of claim 1 wherein the topographical information includes sources of signal diffraction.

14. The method of claim 1 wherein the topographical information includes building surfaces.

15. The method of claim 1 wherein the topographical information includes signal attenuation information.

16. The method of claim 1 wherein the act of determining a set of final candidate locations from the determined candidate locations includes eliminating at least some of the candidate locations using the times of arrival associated with the signals from which trace-back rays were determined.

17. The method of claim 16 wherein a candidate location is eliminated if the times of arrival are inconsistent with expected times of arrival.

18. The method of claim 17 wherein a time of arrival is determined to be inconsistent with an expected time of arrival if they differ by more than a threshold difference.

19. The method of claim 1 wherein the act of determining a set of final candidate locations from the determined candidate locations includes eliminating at least some of the candidate locations using the amplitudes associated with the signals from which trace-back rays were determined.

20. The method of claim 19 wherein a candidate location is eliminated if the amplitudes are inconsistent with expected amplitudes.

21. The method of claim 19 wherein an amplitude is determined to be inconsistent with an expected amplitude if they differ by more than a threshold difference.

22. The method of claim 1 wherein the act of determining a set of final candidate locations from the determined candidate locations includes eliminating at least some of the candidate locations using both the times of arrival and the amplitudes associated with the signals from which trace-back rays were determined.

23. The method of claim 1 wherein the act of determining a set of final candidate locations from the determined candidate locations includes

i) determining if the times of arrival are inconsistent with expected times of arrival;

ii) if it was determined that the times of arrival are inconsistent with expected times of arrival, then excluding the candidate location from the set of final candidate locations; and

iii) if it was determined that the times of arrival are not inconsistent with expected times of arrival, then

A) determining if the amplitudes are inconsistent with expected amplitudes, and

B) if it was determined that the amplitudes are inconsistent with expected amplitudes, then excluding the candidate location from the set of final candidate locations.

24. The method of claim 1 wherein the act of determining the location of the object of interest using the set of final candidate locations includes

i) defining an area of accuracy including at least one candidate location from the set of final candidate locations, and

ii) determining the location of the object of interest using the defined area of accuracy.

25. The method of claim 24 wherein the area of accuracy is a circle of accuracy.

26. The method of claim 24 wherein at least two areas of accuracy are defined, and

wherein the act of determining the location of the object of interest uses a cardinality of each of the areas of accuracy.

27. The method of claim 24 wherein at least two areas of accuracy are defined, and

wherein the act of determining the location of the object of interest includes

A) defining at least one cluster, each cluster including locations of each of at least two areas of accuracy, and

B) determining the location of the object of interest using the at least one cluster.

28. The method of claim 27 wherein the act of determining the location of the object of interest uses a location of the at least one cluster.

29. The method of claim 27 wherein at least two clusters are defined, each of the at least two clusters having an associated diameter and

wherein the act of determining the location of the object of interest uses the diameter of each of the at least two clusters.

30. The method of claim 27 wherein at least two clusters are defined, each of the at least two clusters having an associated cluster cardinality, and

wherein the act of determining the location of the object of interest uses the cluster cardinality of each of the at least two clusters.

31. The method of claim 27 wherein at least two clusters are defined, each of the at least two clusters having both an associated diameter and an associated cluster cardinality, and

wherein the act of determining the location of the object of interest uses the cluster cardinality and the diameter of each of the at least two clusters.

32. The method of claim 27 wherein at least two clusters are defined, each of the at least two clusters having

- associated areas of accuracy, each of the associated areas of accuracy having a cardinality,
- an associated diameter, and
- an associated cluster cardinality, and

wherein the act of determining the location of the object of interest uses

- the cardinalities of the areas of accuracy associated with each of the at least two clusters,
- the diameters associated with each of the at least two clusters, and
- the cluster cardinalities associated with each of the at least two clusters.

33. The method of claim 1 wherein the act of determining the location of the object of interest using the set of final candidate locations includes

i) defining a volume of accuracy including at least one candidate location from the set of final candidate locations, and

ii) determining the location of the object of interest using the defined volume of accuracy.

34. The method of claim 33 wherein the volume of accuracy is a sphere of accuracy.

35. The method of claim 33 wherein at least two volumes of accuracy are defined, and

wherein the act of determining the location of the object of interest uses a cardinality of each of the volumes of accuracy.

36. The method of claim 33 wherein at least two volumes of accuracy are defined, and

wherein the act of determining the location of the object of interest includes

A) defining at least one cluster, each cluster including locations of each of at least two volumes of accuracy, and

B) determining the location of the object of interest using the at least one cluster.

37. The method of claim 36 wherein the act of determining the location of the object of interest uses a location of the at least one cluster.

38. The method of claim 36 wherein at least two clusters are defined, each of the at least two clusters having an associated diameter and

wherein the act of determining the location of the object of interest uses the diameter of each of the at least two clusters.

39. The method of claim 36 wherein at least two clusters are defined, each of the at least two clusters having an associated cluster cardinality, and

wherein the act of determining the location of the object of interest uses the cluster cardinality of each of the at least two clusters.

40. The method of claim 36 wherein at least two clusters are defined, each of the at least two clusters having both an associated diameter and an associated cluster cardinality, and

wherein the act of determining the location of the object of interest uses the cluster cardinality and the diameter of each of the at least two clusters.

41. The method of claim 36 wherein at least two clusters are defined, each of the at least two clusters having

- associated volumes of accuracy, each of the associated volumes of accuracy having a cardinality,
- an associated diameter, and
- an associated cluster cardinality, and

wherein the act of determining the location of the object of interest uses

- the cardinalities of the volumes of accuracy associated with each of the at least two clusters,
- the diameters associated with each of the at least two clusters, and

the cluster cardinalities associated with each of the at least two clusters

42. Apparatus for locating an object of interest, the apparatus comprising:

a) an input for accepting at an observation point, signals emanating from the object;

b) means for determining, for each of the accepted signals, at least one of (A) an associated time of arrival, (B) an amplitude, and (C) direction of arrival;

c) means for determining at least two trace-back rays from the observation point using the direction of arrival of signals and topographical information;

d) means for determining candidate locations at crossings of two or more trace-back rays;

e) means for determining a set of final candidate locations from the determined candidate locations; and

f) means for determining the location of the object of interest using the set of final candidate locations.

43. The apparatus of claim 42 wherein the means for determining, for each of the accepted signals, at least one of (A) an associated time of arrival, (B) an amplitude, and (C) a direction of arrival.

44. The apparatus of claim 42 wherein the topographical information includes sources of signal reflection.

45. The apparatus of claim 42 wherein the topographical information includes sources of signal diffraction.

46. The apparatus of claim 42 wherein the topographical information includes building surfaces.

47. The apparatus of claim 42 wherein the topographical information includes signal attenuation information.

48. The apparatus of claim 42 wherein the means for determining a set of final candidate locations from the determined candidate locations include means for eliminating at least some of the candidate locations using the times of arrival associated with the signals from which trace-back rays were determined.

49. The apparatus of claim 42 wherein the means for determining a set of final candidate locations from the determined candidate locations include means for eliminating at least some of the candidate locations using the amplitudes associated with the signals from which trace-back rays were determined.

50. The apparatus of claim 42 wherein the means for determining a set of final candidate locations from the determined candidate locations include means for eliminating at least some of the candidate locations using both the times of arrival and the amplitudes associated with the signals from which trace-back rays were determined.

51. The apparatus of claim 42 wherein the means for determining a set of final candidate locations from the determined candidate locations includes means for

i) determining if the times of arrival are inconsistent with expected times of arrival;

ii) if it was determined that the times of arrival are inconsistent with expected times of arrival, then excluding the candidate location from the set of final candidate locations; and

iii) if it was determined that the times of arrival are not inconsistent with expected times of arrival, then

A) determining if the amplitudes are inconsistent with expected amplitudes, and

B) if it was determined that the amplitudes are inconsistent with expected amplitudes, then excluding the candidate location from the set of final candidate locations.

52. The apparatus of claim 42 wherein the means for determining the location of the object of interest using the set of final candidate locations include means for

i) defining an area of accuracy including at least one candidate location from the set of final candidate locations, and

ii) determining the location of the object of interest using the defined area of accuracy.

53. The apparatus of claim 42 wherein the means for determining the location of the object of interest using the set of final candidate locations include means for

i) defining a volume of accuracy including at least one candidate location from the set of final candidate locations, and

ii) determining the location of the object of interest using the defined volume of accuracy.